CLAIMS:

~~1. An oil-cooled electric motor for a vehicle,~~ comprising:

a motor casing having first and second casing ends;

a rotor having a cylindrical rotor core and a rotor shaft extending through said rotor core, said rotor shaft rotatably supported by said motor casing;

a stator core having a plurality of stator slots and a plurality of windings disposed in said stator slots, said stator core disposed around said rotor, said stator core having first and second stator ends; and

a first oil spray nozzle retainer disposed proximate said first stator end and a second oil spray nozzle retainer disposed proximate said second stator end, each said first and second oil spray nozzle retainers having a plurality of nozzles disposed therein, said nozzles in flow communication with a supply of cooling oil for spraying cooling oil onto ~~said first and second stator ends.~~

~~2. The electric vehicle motor of claim 1, further~~ comprising a channel disposed in said casing, said channel disposed between and in flow communication with the supply of cooling oil and said nozzles, said channel for receiving the cooling oil into said casing and delivering the cooling oil to said nozzles.

3. The electric vehicle motor of claim 2, further comprising first and second end bells for enclosing said rotor and said stator core within said casing, said first end bell

mechanically affixed to said first casing end and said first oil spray nozzle retainer mechanically affixed to said first end bell, said second end bell mechanically affixed to said second casing end and said second oil spray nozzle retainer mechanically affixed to said second end bell, said channel disposed longitudinally along the top of said casing and further down each said first and second end bells and into flow communication with each said first and second oil spray nozzle retainers.

4. The electric vehicle motor of claim 1, said motor having a motor longitudinal central axis, said first oil spray nozzle retainer being a circular ring and having a first longitudinal central axis, said second oil spray nozzle retainer being a circular ring and having a second longitudinal central axis, said first and second longitudinal central axis coincidental with said motor longitudinal central axis, said nozzles of said first and second oil spray nozzle retainers disposed around said motor longitudinal central axis for spraying cooling oil evenly around said first and second stator ends.

5. The electric vehicle motor of claim 4, each said first and second oil spray nozzle retainers having nine stator nozzles and two rotor nozzles, said stator nozzles disposed evenly around the circumference of said first and second oil spray nozzle retainers and positioned to spray cooling oil at an angle relative to said motor longitudinal central axis, said rotor nozzles positioned to spray cooling oil substantially parallel to said motor longitudinal central axis.

6. The electric vehicle motor of claim 5, wherein each said nozzle sprays cooling oil as a mist having a cone shape.

7. The electric vehicle motor of claim 1, said rotor shaft having first and second shaft ends, wherein said first shaft end extends through said first oil spray nozzle retainer and said second shaft end extends through said second oil spray nozzle retainer.

8. The electric vehicle motor of claim 1, said rotor shaft having first and second shaft ends, further comprising first and second ball bearings, said first shaft end extending through said first ball bearing and said second shaft end extending through said second ball bearing, wherein said nozzles spray cooling oil onto said first and second ball bearings.

9. The electric vehicle motor of claim 1, wherein said rotor core has an inner and outer rotor surface, said rotor core further having a plurality of rotor slots disposed around the periphery of said rotor core proximate said outer rotor surface, each said rotor slot having a rotor slot surface, said rotor having a conducting metal disposed in each said rotor slot, said rotor further having a rotor slot coating deposited onto said rotor slot surface of each said rotor slot, said coating disposed between said conducting ~~metal and said rotor slot surface.~~

10. The motor of claim 9, wherein said rotor slot coating comprises a ~~ceramic-based~~ material.

~~11~~ 3. The motor of claim ~~10~~ 2, wherein the principal component of said ceramic-based material is selected from the group consisting of silicon and germanium.

~~12. The motor of claim 9, wherein said conducting metal is die cast into said rotor slots.~~

13. The motor of claim 12, wherein said conducting metal is copper.

14. The motor of claim 12, wherein said conducting metal is aluminum.

add A4

~~15. An electric motor for a vehicle, comprising:~~

a motor casing, said motor casing having first and second casing ends;

a rotor having a cylindrical rotor core and a rotor shaft extending through said rotor core, said rotor shaft rotatably supported by said motor casing;

a stator core having a plurality of stator slots and a plurality of windings disposed in said slots, said stator core disposed around said rotor; and

first and second end bells for enclosing said rotor and said stator core within said casing, said first end bell mechanically affixed to said first casing end, said second end bell mechanically affixed to said second casing end, said rotor shaft extending through said first and second end bells, said first and second end bells comprising a magnesium alloy.

16. The electric vehicle motor of claim 15, wherein said motor casing comprises magnesium.

17. An oil-cooled electric motor for a vehicle, comprising:

a motor casing having a circumferential inner casing surface;

a rotor having a cylindrical rotor core and a rotor shaft extending through said rotor core, said rotor shaft rotatably supported by said motor casing; and

a cylindrical stator core having a plurality of stator slots and a plurality of windings disposed in said stator slots, said stator core disposed around said rotor, said stator core having a stator outer surface affixed to said inner casing surface;

said motor casing further having a circumferential channel disposed around said inner casing surface and in flow communication with a supply of cooling

oil, said motor casing further having a plurality of casing grooves cut into and extending longitudinally along said inner casing surface, said casing grooves disposed around the circumference of said inner casing surface and in flow communication with said channel; and

said stator core having a plurality of stator grooves cut into and extending along said stator outer surface, said stator grooves disposed around the circumference of said stator outer surface and in flow communication with said channel, wherein cooling oil flows from said channel and into said casing grooves and said stator grooves.

18. The electric motor of claim 17, wherein said casing grooves and said stator grooves are alternatingly positioned around said inner casing surface and said stator outer surface respectively, such that one of said casing grooves is circumferentially adjacent one of said stator grooves.

19. An oil-cooled electric motor for a vehicle, comprising:

a motor casing having a first end;

a rotor having a cylindrical rotor core and a rotor shaft extending through said rotor core, said rotor core having first and second core ends and an outer rotor surface, said rotor further having a plurality of rotor slots disposed around the periphery of said rotor core proximate said outer rotor surface, each said rotor slot having a conducting metal disposed therein and further having an axial channel, said rotor shaft comprising a hollow tube rotatably supported by said motor casing, said hollow tube having an outer surface and an annular rotor channel disposed longitudinally along said outer surface;

a cylindrical stator core having a plurality of stator slots and a plurality of windings disposed in said stator slots, said stator core disposed around said rotor;

a manifold mechanically affixed to said first end, said rotor shaft extending into said manifold, said manifold having an inlet in flow communication with a supply of cooling oil and a manifold passage for supplying the cooling oil to said rotor channel; and

said rotor core further having a plurality of radial passages, each said radial passage in flow communication with said rotor channel, one of each said radial passages in flow communication with said axial channel of one of said rotor slots, wherein cooling oil flows along said rotor channel and said radial passages and into said axial channel of said rotor slots for contacting said conducting metal.

20. An electric vehicle drive system, comprising:

a motor casing;

a rotor having a cylindrical rotor core and a rotor shaft extending through said rotor core, said rotor shaft rotatably supported by said motor casing;

a stator core having a plurality of stator slots and a plurality of windings disposed in said slots, said stator core disposed around said rotor;

cooling means for supplying a flow of cooling oil onto said stator coil;

a drive shaft rotatably coupled to said rotor shaft;

a differential mechanically coupled to said drive shaft and further coupled to an axle for rotating a plurality of vehicle wheels.

21. The electric vehicle drive system of claim 20, said stator core having first and second ends, wherein said cooling means comprises a first and second oil spray nozzle retainer, each having a plurality of nozzles disposed therein, said rotor shaft extending through said first and second oil spray nozzle retainers, said first oil spray nozzle retainer disposed proximate said first end and said second oil spray nozzle retainer disposed proximate said second end, wherein

said nozzles spray cooling oil onto said first and second ends.